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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DOUGHERTY, THOMAS M

ART UNIT PAPER NUMBER

2834

DATE MAILED: 12/12/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/431,201

Applicant(s)

SATO ET AL.

Examiner

Thomas M. Dougherty

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 November 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,9,11-16 and 22-26 is/are rejected.
- 7) ☒ Claim(s) 2,4,5,7,8,10 and 17-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Miki (JP 3-175800). Miki shows (figs. 1a, 1b) a piezoelectric loudspeaker (see title) comprising: a piezoelectric vibrator including a diaphragm (2) and a piezoelectric member (1) provided on at least one face of the diaphragm (2); a frame (5) for supporting the piezoelectric vibrator; and a visco-elastic (6) member provided on at least one face of the piezoelectric vibrator, wherein the visco-elastic member (6) is disposed in a substantial center of the piezoelectric vibrator, and wherein the visco-elastic member has a bottom face area (determined by sight) which accounts for about 11% to about 80% of a bottom face area of the diaphragm (2).

Claims 1, 3, 6, 9 and 22-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kishi (US 4,654,554). Kishi shows (figs. 30, 33) a piezoelectric loudspeaker (see abstract) comprising: a piezoelectric vibrator including a diaphragm (117) and a piezoelectric member (119) provided on at least one face of the diaphragm (117); a frame (conic member) for supporting the piezoelectric vibrator; and a visco-elastic (121) member provided on at least one face of the piezoelectric vibrator, wherein the visco-elastic member (121) is disposed in a substantial center of the piezoelectric

vibrator, and wherein the visco-elastic member (121) has a bottom face area (determined by sight) which accounts for about 11% to about 80% of a bottom face area of the diaphragm (117). The visco-elastic member (121) comprises first and second visco-elastic members (121) which are provided on opposite sides of the piezoelectric vibrator. A rigid member (124) is provided on the visco-elastic member (121), the rigid member having a specific gravity which is larger than a specific gravity of the visco-elastic member. This is implicit in the discussion of 124 at column 12, lines 18-37. An element (124) is provided in a central portion of the visco-elastic member, at least one of specific gravity and elastic modulus of the element being larger than specific gravity and/or elastic modulus of the visco-elastic member. Note that as one member is rigid and one is compliant, the claimed characteristics are met. The device further comprises a lead wire (see fig. 9, wire is not numbered) for applying an electric input to the piezoelectric member, wherein the piezoelectric vibrator has at least one through hole (not numbered, bottom, center-right of casing) through which the lead wire is coupled to the piezoelectric member. The device further comprises a cover (18) for protecting at least one said visco-elastic member (7) and the piezoelectric vibrator. A conductive terminal for applying an electrical input to the piezoelectric member is provided within the cover (connected to the wire).

Claims 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kishi (US 4,654,554). Kishi shows (fig. 9) a piezoelectric loudspeaker comprising: a piezoelectric vibrator including a diaphragm (metal plate) and a piezoelectric member (not numbered) provided on at least one face of the diaphragm, the diaphragm being

vibrated by the piezoelectric member; a frame (14) for supporting the piezoelectric vibrator; and a support element (16, 8) for supporting the piezoelectric vibrator at a substantial center of the piezoelectric vibrator. The piezoelectric loudspeaker further comprising a visco-elastic member (7) provided on at least one face of the piezoelectric vibrator.

Claim 14 is rejected under 35 U.S.C. 102(b) as being anticipated by Rapps et al. (US 5,446,332). Rapp shows (e.g. fig. 6c) a piezoelectric loudspeaker comprising: a piezoelectric vibrator including a diaphragm (3) and a plurality of piezoelectric members (2, 4) provided on at least one face of the diaphragm (3), the diaphragm being vibrated by the plurality of piezoelectric members (2, 4); and, a frame (1) for supporting the piezoelectric vibrator. Note that no voltage application means are claimed and thus the application of voltages is a goal of the invention which carries no patentable weight.

Claims 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Miki (JP 3-175800). Miki shows (figs. 1a and 1b) a piezoelectric loudspeaker comprising: a piezoelectric vibrator including a diaphragm (2) and a plurality of piezoelectric members (1) provided on at least one face of the diaphragm (2), the diaphragm being vibrated by the piezoelectric members (1); and, a frame (5) for supporting the piezoelectric vibrator. Note that no voltage application means are claimed and thus the application of voltages is a goal of the invention which carries no patentable weight. The device further comprising a visco-elastic member (6) provided on at least on face of the piezoelectric vibrator.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi (US 4,654,554) in view of Barr (US 5,161,200). Given the invention of Kishi as noted above, he fails to show the support element including a conductive portion which is in electrical contact with the piezoelectric vibrator, and an electrical input is applied to the conductive portion. Barr shows (fig. 1) a piezoelectric microphone comprising: a piezoelectric vibrator including a diaphragm (13) and a piezoelectric member (14) provided on at least one face of the diaphragm (13); a frame (5) for supporting the piezoelectric vibrator; and a conductive portion (18) which is in electrical contact with the piezoelectric vibrator, and an electrical input (18) is applied to the conductive portion (15). He doesn't show a loudspeaker per se or a central support. He does not show a support element for supporting the piezoelectric vibrator at a substantial center of the piezoelectric vibrator. It would have been obvious to one having ordinary skill in the art to employ an electrical connection at a central location in the device of Kishi, such as is shown by Barr since this would shorten the wire within the device and lessen the risk of unintentional snags or electrical shorts of the wire.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miki (JP 3-175800) in view of Kitanishi (US 5,321,761). Given the invention of Miki as noted above, he doesn't show the input to at least one of the plurality of piezoelectric members as being via an electrical resistance. Kitanishi shows (figs. 2 and 7) a piezoelectric sound generator comprising: a piezoelectric vibrator including a diaphragm (20) and a piezoelectric member (21) provided on at least one face of the diaphragm (20), the diaphragm being vibrated by the piezoelectric member (21); and, a frame for supporting the piezoelectric vibrator. He notes (fig. 7) the input to the piezoelectric member as being via an electrical resistance (e.g. 4). He doesn't show a plurality of piezoelectric members and his device is not a loudspeaker. It would have been obvious to one having ordinary skill in the art to apply to the input of at least one of the plurality of piezoelectric members of Miki's device as being via an electrical resistance in order to reduce the chance that an overvoltage is applied, thereby damaging the device.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miki (JP 3-175800). Given the invention of Miki as noted above, he further shows a diameter of the visco-elastic member being smaller than the inner diameter of the frame but he doesn't show the bottom face area of the visco-elastic member as being equal to or greater than the bottom face area of the piezoelectric member. It would have been an obvious matter of design choice to so size the visco-elastic member since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 2377 (CCPA 1955).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miki (JP 3-175800) in view of Knecht (US 5,577,319). Given the invention of Miki as noted above, he doesn't discuss use of a conductive portion in the frame which is in electrical contact with the piezoelectric vibrator and an electrical input is applied to the conductive portion. Knecht notes a conductive frame for connection to different electrical elements including a piezoelectric element at col. 3, lines 10-17. He doesn't note a piezoelectric loudspeaker structure. It would have been obvious to one having ordinary skill in the art to employ the teaching of Knecht, that being use of a conductive frame or portion thereof, in the device of Miki at the time of his invention thereby eliminating the necessity for wiring within the device and presenting thus, the risk of disconnection of the wire, resulting in electrical short circuits.

***Allowable Subject Matter***

Claim 2, 4, 5, 7, 8, 10 and 17-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to show or fairly suggest use of two visco-elastic members which are stacked on top of each other and/or which are of different materials or different shapes. Also not shown nor fairly suggested is use of a single visco-elastic material filling apertures in a diaphragm in a piezoelectric loudspeaker, or a visco-elastic material having a conical configuration in combination with a horn-like frame



configuration. The visco-elastic materials of the prior art are not notched. No teaching is noted for provision of connecting the visco-elastic member to the frame by means of covering it with a plate so that an enclosed space is formed by the plate, the frame, and the diaphragm. The prior art doesn't show or fairly suggest two split members of the visco-elastic member provided on at least one face of the piezoelectric vibrator. The prior art doesn't show or fairly suggest application of voltages to at least two different piezoelectric members on a diaphragm in a loudspeaker device in which the voltages are interconnected by an electrically resistant element.

**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on at least some aspects of the claimed invention.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

*tmd*  
tmd

December 6, 2001

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